

ABSTRACT OF THE DISCLOSURE

A single mode photonic crystal fiber including a core with a geometric radius ρ , and a cladding surrounding the core, the 5 cladding including a plurality of cylindrical air holes which have a diameter d and are arranged periodically at center-to-center spacings of Λ . A design is made such that the center-to-center spacing Λ between the air holes is made 1.5 or more times greater than a wavelength λ of propagation light, 10 and a V value given by the following expression is made greater than 2.4 and less than 3.3. At least one of geometric placement of the air holes in the cladding and optical constant distribution of the cladding or core is set less than three-fold rotational symmetry with respect to a central axis of the core.

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$$V = \frac{2\pi\rho}{\lambda} (n_{core}^2 - n_{eff}^2)^{1/2}$$

where n_{eff} is an effective refractive index of the cladding, and n_{core} is a refractive index of the core.